

# Environmental Management and Monitoring Programme

GR-E07

## Overview

This procedure provides an overview of all the necessary environmental monitoring procedures and controls to ensure compliance with the Site Environmental Permit.

## 1. Dust, Fibres and Particulates

### 1.1 Environmental Dust Monitoring

Occupational and environmental dust is not considered a potential issue at site. The key dust generating activities are related to:

- the potential mishandling of char produced by the pyrolysis units;
- the shredding of wastes prior to autoclaving; and
- the handling of dried (RDF) materials produced by the autoclave and drier.

For this reason, the site has a number of dust mitigation measures in place to manage dust related impacts.

Potential dust emissions from the site residues will be controlled by the following means:

- All operations are internal;
- Minimisation of double handling;
- Shredding of pre-sterilised non-hazardous wastes takes place in the dedicated shredder within in the reception hall of the building and only when the fast action doors are closed;
- Shredding of Clinical Wastes is in a fully enclosed shredder system with fitted HEPA filter;
- Sterilised waste is in damp form following autoclaving and drop heights to the drier will be minimised;
- Dried RDF is stored within dedicated enclosed fuel bunkers prior to use in the pyrolysis units;
- Char is kept in an enclosed silo and dampened prior to export offsite;
- The entire building has extraction fitted to ensure no escape of loose dust from the building;
- All transport of material offsite is within covered vehicles.

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Dust levels will be monitored by a visual assessment to be undertaken on a daily basis by a competent person and be overseen by the Operations Manager. It is the duty of all site operatives to be vigilant and report any problems immediately to the competent person who will implement corrective action. The Operations Manager is responsible for recording the details relating to the findings of the visual assessment in the site diary.

Where visible aerial emissions of dusts, particulates and fibres persist beyond the site boundary, the Operations Manager will ensure that immediate corrective action is undertaken and the EA is notified accordingly.

### 1.2 Offsite Impacts and Monitoring

Under normal operation it is considered unlikely that there will be any offsite dust impacts, however in the event of any internal or external complaints the site management will carry out a full investigation to understand the validity of the complaint.

All complaints will be logged in a central file, investigated by the operations manager (or their delegate) to establish the nature of the complaint and the operating conditions at the time of the complaint.

If the complaint is substantiated the site will review operating practices on site to establish the root cause of the incident.

Where deemed necessary the site shall carry out third party dust measurements at the site boundary and receptors to further establish impacts, root cause and potential mitigation measures.

## 2. Noise

The site is not located in an area considered to be overly sensitive to noise. Despite this, a noise impact assessment has been undertaken. Noise is not considered to be a significant potential source of pollution to the environment due to the mitigation and abatement employed.

The main sources of noise at the site will include:

- Delivery/collection vehicles; and
- Plant.

The following procedures will help minimise noise emissions:

- All machinery on site will be fitted with effective silencers;
- All machinery will be turned off when not in use;
- All plant is fitted within acoustic abatement equipment; and
- Deliveries will typically take place during daytime hours where possible.

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## 2.1 Environmental Noise Monitoring

There are no requirements to monitor noise at the site.

Detailed noise monitoring shall be carried out in the event of an internal or external complaint.

Noise monitoring shall only be carried out by a competent person (as defined by the Institute of Acoustics) to a scope that is determined by the nature of the complaint.

## 2.2 Occupational Noise Monitoring

Occupational noise and vibration presents a significant health and safety risk to all personnel on site.

Occupational monitoring of a Significant Exposure Groups (SEGs) will be carried out periodically (at least bi-annually) to monitor and risk assess the exposure levels of the personnel.

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### 3. Odour

The wastes that will be processed through the autoclave system will have the potential for odour generation. The proposed handling of all wastes onsite is fully enclosed and will not result in any odorous releases.

Furthermore, the fundamental design of the facility has a hierarchy of odour control and abatement measures to ensure that the potential for odour impacts are eliminated.

The sites stringent pre-acceptance procedures will reduce the possibility of malodourous wastes entering the site. The building is fitted with fast action doors with odourising mister fitted externally above them.

There will be no external storage of waste. All wastes are stored internally within the building.

All clinical waste is stored bagged within lidded wheelie bins internally within the building, before being transferred to the dedicated sequenced loading system and shredders for transfer into the autoclaves.

Shredding of wastes prior to processing through the autoclave is undertaken within enclosed clinical waste shredders with extraction to the Scrubbing Air Handling System. There is no storage of shredded wastes onsite – interim containment of shredded wastes prior to loading into the autoclaves is typically for no longer than 2 hours and within a fully enclosed secure container with extraction via a dedicated HEPA filter to the Scrubbing Air Handling System. Shredded wastes are accumulated only for the purposes of generating a full autoclave load prior to loading and processing through the autoclaves.

Clinical wastes are transferred through the sites dedicated enclosed shredding and loading system to control the loading of wastes into the autoclaves whilst preventing odour and dust pollution. The system is completely sealed to ensure no escape of emissions to atmosphere.

All loads shall be inspected prior to acceptance.

The entire building is maintained under negative pressure through the sites Scrubbing Air Handling system which has been designed to ensure a minimum of 3 air changes per hour. All emissions from the building and process are treated through scrubbing towers to treat and minimise odour release prior to discharged to atmosphere. There are 5 dedicated scrubbing systems onsite, each with two scrubbing towers. Each system extracts and treats air from different areas of the site.

‘Non-condensable’ gases from the autoclave process are routed to the pyrolysis plant where any odourous compounds are thermally destroyed prior to discharge to atmosphere. In abnormal circumstances if the pyrolysis plant is not in operation, ‘non-condensable’ gases are diverted to the emergency flare for thermal oxidation.

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All potentially odourous emissions from the drier are routed through the Scrubbing Air Handling System prior to discharge to atmosphere.

In addition to the above measures, a Corgin probe de-odourising misting system is present within the reception hall which will be employed where required to help negate odours from incoming wastes.

The Scrubbing Air Handling System is subject to a comprehensive preventative maintenance procedure to ensure continued and effective operation of the odour abatement control. No site operations will take place without full effective operation of the odour control measures (i.e. no site operations will ensue during periods of maintenance or shut down of the Simdean units or pyrolysis plant).

Both the Scrubbing Air Handling System and the pyrolysis plant are key odour control devices and must always be operational during site activities.

Air is blown into the building from the Fresh Air System (FAS) through externally positioned external fans.

All effluent from the clinical waste area and bin wash is collected and directed to the waste water treatment plant.

As a result of these measures, under normal operation, it is considered highly unlikely that there will be any odour release from the site. Even so, odour monitoring will be undertaken as outlined below to ensure the continued effectiveness of the odour control systems.

Odour shall be monitored daily at points around the site boundary and observations shall be noted in the site diary and/or on a daily monitoring document.

In the unlikely event that any odour is detected and is judged to be moderate (Odour Intensity Rank 3) then the Operations Manager will be notified immediately and the olfactory survey will continue to attempt to determine the scope and extent of the odour plume, as follows:

- A suitable location downwind of the site and potentially sensitive receptor at which the odour plume is unlikely to extend will be selected for assessment;
- Survey will continue toward the facility until a site-related odour is perceived; and
- Assessment points perpendicular to the plume axis and equidistant from the site will then be monitored, subject to access requirements.

The main aim of monitoring will be to test if any odours emitted from the site will be causing the nearest receptors nuisance. In scenarios where nuisance is being caused then operations will be suspended until

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the conditions improve. The Operations Manager may deem it necessary to find the precise source of the odour and attempt to eliminate it or neutralise it immediately.

Daily records shall be maintained and include the following details:

- Results of inspections and olfactory monitoring carried out by site personnel;
- Weather conditions including wind speed and wind direction;
- Operational problems including date, time, duration, prevailing weather conditions and cause of problem;
- Complaints received including address of complainant (if available);
- Details of corrective action taken, and any subsequent changes to operational procedures; and
- An evaluation of the effectiveness of control and abatement techniques used.

## 4. Bioaerosol Emissions Monitoring

Bioaerosol emissions monitoring will take place during commissioning and then on an annual basis and will be monitored through the use of tracer spore suspensions. Under no circumstances will spore strips be used.

In a laboratory environment a dry or liquid suspension of bacillus spores in a number of sealed, small volume plastic containers will be prepared. This will be dispersed through the waste load and process to a quantity of  $1 \times 10^6$  spores per gram of total waste load.

Monitoring of both air and surface will be undertaken. Samples will be taken:

- Before processing the seeded waste
- At intervals during processing (before shredding, during shredding, during conveyance, during autoclaving, upon completion of autoclaving); and
- Every 2 hours after the cycle is complete for up to 10 hours.

### *Air Monitoring*

The locations of sampling for air monitoring will include:

- Around identified point source emissions;
- At the site boundaries; and
- Relevant locations including doors into the building, bin wash area and the site offices.

Active impaction onto agar using Anderson or slit samplers (or equivalent) will be used for bioaerosol sampling.

Sample times will be planned to coincide with key steps in the treatment process where emissions may occur.

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*Surface Monitoring*

Surface monitoring using settle plates forming a grid like pattern around the site will be undertaken to support the air monitoring. The exposure time for each plate, and replacement frequency during testing will be regular and consider contaminants and total microbial load at the time of testing.

The surface monitoring results will indicate the total number of organisms that have settled per hour per grid square and over the whole site. This will be compared to the input dose and a quantitative release estimated for the process.

The bioaerosol emissions from the process will be no greater than those outlined in the table below. Should they be identified as greater, the process will cease and investigation into the cause undertaken prior to continuation of operations.

Table 1: Emission Limits for Bioaerosol Emissions			
Emissions	Measure	Cfu	Unit
<i>Point Source</i>			
Air	Bacillus Spores	1,000	per cubic metre
<i>Fugitive</i>			
Air – sample points >10m from the treatment plant	Bacillus Spores	300	per cubic metre
Surface – sample point <10m from treatment plant		20,000	per square metre per hour
Surface – sample point >10 m from treatment plant		5,000	per square metre per hour

## 5. Weather Monitoring

The meteorological conditions shall be recorded daily within the Site Diary.

## 6. Visual Inspection

All areas of the site shall be visually inspected and monitored for the following:

- Evidence of site security breaches;
- Escape of waste;
- Escape of dust / dust nuisance;
- Presence of elevated fire risk / storage issues;
- Presence of litter;
- Presence of vermin.

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**Table 1: Site Environmental Monitoring Summary**

Parameter	Purpose	Freq	Location	Responsibility	Comment
Dust, fibre and particulates	N/A Visual inspection, though not necessary, will be undertaken to ensure that visible dust is not migrating off site	Daily	Not specified	Operations Manager	Any visible emissions will need to be reported within the site diary.
Noise	Only required in case of specific internal or external noise complaint	As required	TBC	Operations Manager	The noise monitoring shall only be carried out by a competent person (as defined by the Institute of Acoustics) to a scope that is determined by the nature of the complaint.
Odour	Monitoring required to ensure that there are no odour emission resulting from the processing activities on site.	Daily	TBC	Operations Manager	Recorded in the site diary.
Bioaerosol	Demonstrate the emissions are controlled during plant operation	Annually	TBC	Operations Manager	Submitted to EA and recorded in site diary
Groundwater	None required	None	N/A	N/A	No physical groundwater monitoring required.
Surface Water	Visual inspection required to ensure that site drainage is not being impacted by processing activities on site.	Daily	Drainage channels	Operations Manager	No physical sampling required. Visual inspection only.
Weather	General weather conditions to be recorded on site.	Daily	Not specified	Operations Manager	Recorded in the site diary.
Visual	Visual inspection of: <ul style="list-style-type: none"> <li>• Evidence of site security breaches;</li> <li>• Escape of dust / dust nuisance;</li> <li>• Presence of elevated fire risk / storage issues;</li> <li>• Presence of litter;</li> <li>• Presence of vermin; and</li> <li>• Control of waste storage.</li> </ul>	Daily	Site wide	Operations Manager	Recorded in the site diary.

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## 7. Training Record

The below signatories have received training and understand all aspects of procedure GR-E07.

Table 6.1: Training				
PRINT EMPLOYEE NAME	EMPLOYEE SIGNATURE	DATE	MANAGER INITIALS	UN-CONTROLLED COPY ISSUED (✓)

<b>Author / Function or Department:</b>	<b>Process Owner / Department:</b>
	Operations Manager